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Research article

Persistence of attitude change and attitude–behavior correspondence based on extensive processing of source information

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Abstract

A three-phase longitudinal study (spread over a month’s time) was carried out to investigate attitude’s persistence and linkage to behavior as it may be affected by the processing of information about the communication source. The following three independent variables were manipulated: (i) contents of the source of information (implying the communicator to be expert or inexperienced on the topic of the communication); (ii) length of the source information (brief versus lengthy); and (iii) message recipients’ involvement in the issue at hand (high versus low). Replicating prior research when the source information was brief, it exerted greater persuasive impact under low versus high involvement, and when it was lengthy, it exerted greater persuasive impact under high versus low involvement. Of greater importance, the newly acquired attitudes were more persistent and were linked more strongly to actual behavior when the source information was lengthy (versus brief) provided the recipients had high (versus low) involvement in the issue. These findings were interpreted to mean that just like with the message/issue information in prior research, when processed extensively, source information, too, may contribute to the formation of persistent and behavior-driving attitudes. Copyright © 2011 John Wiley & Sons, Ltd.

Social psychologists’ interest in attitudes and attitude change (for recent reviews, see Albarracín, Johnson, & Zanna, 2005) has been derived to a large extent from the supposition that *prior* attitudes predict *subsequent* behavior (Fazio, 1990; Fazio & Zanna, 1981; McGuire, 1968, 1985; Petty & Cacioppo, 1986). For that to happen, it would seem incumbent that the newly acquired attitudes exhibit stability and persistence, at least up to the point when a specific behavioral intention is formed and the behavior is carried out. In light of this assumption, a veritable crisis erupted in the domain of attitude research when a large body of evidence appeared to suggest that persuasion rarely persists (Cook & Flay, 1978) and that behaviors do not seem to change in accordance with attitude change (Festinger, 1964). In this vein, Wicker (1969, p. 75) pessimistically assessed the status of attitude research to conclude that there is “little evidence to suggest the postulated stable, underlying attitudes within the individual which influence both his verbal expressions and his actions.”

A constructive response to the crisis in attitude research was undertaken by the proponents of the dual-process approach to attitude change (Chaiken, Liberman, & Eagly, 1989; Petty & Cacioppo, 1986) whose strategy was to identify the moderators of attitude persistence and of attitude behavior relations. A major moderator had to do with the thoroughness

with which *message or issue* information was processed. Extensive processing was referred to as central route processing in the elaboration likelihood model (ELM; Petty & Cacioppo, 1986) and as a systematic mode of processing in the heuristic systematic model (HSM; Chaiken et al., 1989). In this connection, the seventh postulate of the ELM states that “attitude changes that result mostly from processing *issue-relevant arguments* (central route) will show greater *temporal persistence, greater prediction of behavior, and greater resistance to counterpersuasion* than attitude changes that result mostly from peripheral cues” (Petty & Cacioppo, 1986, p. 175, emphasis added). The underlying logic here is that

attitude changes induced via the central route involve considerably more cognitive work than attitude changes induced under the peripheral route. . . Under the central route then, the *issue-relevant* attitude schema may be accessed, rehearsed, and manipulated more times strengthening the interconnections among the components and rendering the schema more internally consistent, accessible, enduring, and resistant than under the peripheral route (Petty & Cacioppo, 1986; pp. 175–176).

Empirical research conducted from the dual-process perspective offered support for the foregoing notions. Specifically,

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experiments have shown that persuasion attained via extensive processing of *message or issue information* due to increased issue involvement, response involvement, or need for cognition leads to greater attitude persistence over time (Chaiken, 1980, Study 1; Chaiken & Eagly, 1983, Study 2; Petty, Cacioppo, & Heesacker, unpublished, summarized in Mackie, 1987; Petty & Cacioppo, 1986). There is also evidence that extensive processing of *message or issue information* prompted by issue involvement or need for cognition augments the attitude-behavior relation (Cacioppo, Petty, Kao, & Rodriguez, 1986; Leippe & Elkin, 1987; Petty, Cacioppo, & Schumann, 1983).

The dual-process frameworks typically associate the notion of extensive information processing with the processing of *message or issue information*, and reserve the notion of shallow or brief processing to the processing of peripheral cues (such as the source's apparent expertise), or of heuristic information of various kinds (for reviews, see Kruglanski, Erb, Pierro, Mannetti, & Chun, 2006; Kruglanski & Gigerenzer, 2011; Kruglanski, Pierro, Mannetti, Erb, & Chun, 2007). Note that in much published persuasion research, "peripheral" or "heuristic" information did not require extensive processing because it was generally presented in a *brief and simple format* (Pierro, Mannetti, Erb, Spiegel, & Kruglanski, 2005). However, if by peripheral or heuristic information one means information *external to the message or the issue* (as it has been generally treated in the relevant research literature), then such information need not be presented briefly or simply; indeed, it may be presented lengthily and complexly, in which case it may require, and afford, extensive processing. In other words, prior empirical and conceptual treatments of "peripheral/heuristic" versus "central/systematic" processing failed to distinguish between the *what* of processing (i.e., the kind of information processed, whether it be endogenous or exogenous to the message) and the *how* of processing; that is, whether the information is processed *thoroughly* and *extensively* or *superficially* and *briefly*.

In several prior studies, we have decoupled the type of information (whereas endogenous or exogenous to the message or the issue) from its length and complexity determining its processing requirements. We found that when information generally referred to as peripheral/heuristic (e.g., source expertise) is presented lengthily and complexly, it exerts a persuasive impact only in the presence of considerable motivational involvement on the part of research participants and/or in the presence of adequate cognitive resources required for extensive processing. We also found that when message or issue information is presented briefly and simply, it exerts a persuasive impact in the absence of participants' motivational involvement or in the absence of considerable cognitive resources for processing (Kruglanski & Thompson, 1999; Kruglanski et al., 2006; Kruglanski et al., 2007; Pierro et al., 2005). These findings suggest that message/issue and peripheral/heuristic information are functionally equivalent as far as the persuasion process is concerned. Specifically, both function as types of *evidence* for attitudinal conclusions. The differences in their impact under different processing conditions (related, e.g., to the participants' degree of motivational involvement in the topic or their possession of adequate cognitive resources) may have stemmed from incidental factors having to do with the way these information types were operationalized (e.g., as presented briefly or lengthily) in prior persuasion research.

But momentary attitude change could be fleeting. It could lack the persistence and stability needed to foster subsequent behavior. If our theory is valid, and if message/issue and peripheral/heuristic information types are functionally equivalent as claimed, it should follow that extensive processing of peripheral/heuristic information should exhibit the same positive effect on attitudes' persistence and behavioral impact as was previously claimed for message/issue information (e.g., Cacioppo et al., 1986; Chaiken, 1980; Leippe & Elkin, 1987; Mackie, 1987; Petty et al., unpublished, summarized in Petty & Cacioppo, 1986; Petty et al., 1983). This, heretofore untested, derivation of our theory is of particular importance in light of social psychologists' pre-eminent interest in the behavior-driving potential of attitudes. Accordingly, this study was designed to put this theoretical implication to empirical test.

Specifically, we manipulated orthogonally information about the *expertise* of the source (inexpert, expert), the *length* of such information (brief, lengthy), and issue *involvement* (low, high). As our previous work suggests, the greater processing difficulty of the lengthier source information requires a correspondingly greater amount of processing resources (Kruglanski & Thompson, 1999; Kruglanski et al., 2006; Kruglanski et al., 2007; Pierro et al., 2005). The mobilization of resources prompted by issue involvement should allow the lengthier information to exert a persuasive effect, whereas the shorter information does not require considerable resources and hence could exert persuasive effects also in the absence of extensive involvement. As a *preliminary* aim of our study, we thus expected to replicate our prior finding that the short (but not the long) *source information* will exert a persuasive effect, reflected in a difference between expert and inexpert sources, under low issue involvement, whereas the long (but not the short) source information will show a difference between expert and inexpert sources under high issue involvement (Pierro et al., 2005).

However, the main purpose of this investigation was to go beyond prior findings by investigating whether, in the same way that extensively processed lengthy *message/issue* information produced persistent, behavior-driving attitudes in prior work, extensively processed lengthy (but not brief) *source information* would produce persistent and behavior-driving attitudes. In other words, where attitude change as a function of the expert/inexpert manipulation is manifest in the immediate aftermath of the persuasive communication, such change should persist and be related to behavior where the communication is lengthy, and the processing motivation (affording extensive processing) is high. Where attitude as a function of the expert/inexpert manipulation is based on a brief, shallowly processed, communication, it should exhibit neither persistence nor a relation to behavior. Should these hypotheses be corroborated, we would have an important support for the notion that message/issue and heuristic/peripheral information types are functionally equivalent in that their extent of processing determines attitudinal persistence and behavioral impact.

METHOD

Participants and Design

The participants in this research were 124 first year students (99 women and 25 men, mean age = 21 years) in psychology

at the University of Rome, "La Sapienza." Gender did not exert any significant effects in this study; hence, it will be omitted from further consideration. The participants volunteered for a study on "impression formation." They were randomly assigned to one of eight experimental conditions. The design was a $2 \times 2 \times 2$ factorial with the following independent variables: (i) length of expertise information (brief versus long); (ii) contents of expertise information (inexpert versus expert); and (3) issue involvement (low versus high). We expected, first, to replicate prior findings whereby recipients under low involvement would be persuaded by short source information but not by lengthy source information, whereas recipients under high involvement would be persuaded by lengthy source information but not by short source information, resulting in a three-way interaction of our independent variables on participants' attitudes.

Of greater present interest, we expected that with the lengthy (but not brief) source information in place, attitude change resulting from high (versus low) issue involvement would be more persistent over time and would be more strongly correlated with attitude-correspondent behavior.

Stimulus Materials

The participants were presented with a proposal that argued in favor of implementing "a requirement of students majoring in a three year undergraduate course in technical and psychological sciences to participate in at least 10 experiments a year for a total of 15 experimental hours to be accumulated during their course of study." Approximately half the participants, those in the *high involvement* condition, were led to believe that if adopted by the university, this proposal would take effect the following year (during the academic year 2004/2005) so that they would be personally impacted by the new policy. The remaining half of the participants, those in the *low involvement* condition, were led to believe that the proposal would not be adopted before the year 2008 so that they would not be affected personally. The persuasive message was attributed to a (fictitious) communicator referred to as "Mr. Davide Biancato." Information about Biancato's expertise preceded the message. In the *high expert* condition, Biancato's curriculum vitae (CV) introduced him as a full professor in cognitive psychology at the prestigious university of Milan, and an expert on career counseling of psychology students, and on curriculum development, both topics on which he lectured and delivered several papers at scientific meetings. In the *low expert* condition, the CV identified Biancato as an expert on the psychology of tourism and an instructor of tourism studies at a low prestige technical institute. In the *lengthy* source information condition, Biancato's CV was presented in a full-fledged one-page version, whereas in the *brief* condition, the CV's essence was presented in a brief passage counting 50 words.

After their exposure to the source information, the participants read the persuasive message contained in an alleged abstract of a conference presentation written by Biancato on the topic of students' participation in experiments. After initially expressing a strong support for implementation of the requirement to participate in the experiments, the letter listed seven arguments that added up to a message of moderate overall persuasiveness in favor of participation.

Procedure and Dependent Variables

The experiment consisted of *three* phases. The first phase comprised the presentation of the persuasive message and source information and assessed their effects on the participants' attitudes. This phase constituted the replication part of our study designed to replicate prior results. The second, novel, phase took place 3 weeks hence, and it assessed the *persistence* of the participants' attitudes and their behavioral intentions in regard to behavior advocated in the persuasive message (participation in experiments). Finally, the third, novel phase as well, occurred 1 week following the second phase (hence 4 weeks following the first phase), and it investigated the participants' actual behavior. In what follows, we describe these three phases in greater details.

Phase 1

The experiment was conducted in a large university classroom. In its general features, the procedure resembled that employed by Kruglanski and Thompson (1999) and Pierro et al. (2005, Study 1). The participants read an introductory paragraph about a proposal to institute a policy requiring all students in the 3-year psychology program to participate in at least 10 experiments, for a total of at least 15 hours during their entire course of studies. The participants were then exposed to subsequent information designed to institute the various experimental conditions. After processing the source information and the persuasive message, the participants were asked to respond to a questionnaire that contained our measures of the dependent variables as well as containing checks on the efficacy of the manipulations.

Measurement of Attitudes at Time 1

The first 7 items of the questionnaire presented to the participants inquired into their attitudes toward the proposal. These constituted the Time 1 measure of attitudes. The first item read,

To what extent do you personally agree or disagree with the proposal to introduce the requirement for students enrolled in the three year study program to participate in at least 10 experiments for the total of at least 15 hours during their course of studies?

The participants indicated their agreement on a 10-point rating scale ranging from 1 (*completely disagree*) to 10 (*completely agree*). The remaining six items constituted identically scaled semantic differentials designed to indicate the extent to which the participants thought that the "requirement for participation in experiments" was "bad"—"good", "damaging"—"advantageous", "foolish"—"wise", "useless"—"useful", "unproductive"—"productive" and "inopportune"—"opportune." Responses to the seven attitude questions were highly and positively correlated (Cronbach's $\alpha = .96$), and we averaged them to a combined index of attitudes at Time 1.

Checks on Manipulations

Four subsequent items served as a manipulation check of *source expertise*. The first item read, "To what extent this instructor is knowledgeable as to the relevant considerations

regarding the requirement of psychology students to participate as subjects in experiments." Responses were recorded on a scale ranging from 1 (*not at all knowledgeable*) to 10 (*very knowledgeable*). The second item asked, "How qualified was this instructor to make serious recommendations about the consequences of introducing such a requirement?" on a scale ranging from 1 (*not at all qualified*) to 10 (*very qualified*). The third item read, "How would you characterize the instructor's level of competence regarding the requirement for students to participate as subjects in experiments." Responses were recorded on a scale ranging from 1 (*not at all competent*) to 10 (*very competent*). The fourth item inquired, "To what extent the author of the letter is sufficiently expert to express well founded opinions with respect to the proposal of introducing the requirement for students to participate as subjects in experiments?" Responses were recorded on a scale ranging from 1 (*not at all expert*) to 10 (*very expert*). They were highly and positively inter-correlated (Cronbach's $\alpha = .91$) and were therefore averaged to form a single index of *perceived expertise*.

A final set of four items checked the efficacy of our manipulation of *personal involvement*. The first item read, "How important to you personally is the proposal to require students to participate as subjects in experiments?" Responses were recorded on a scale ranging from 1 (*not at all important*) to 10 (*very important*). The second question asked, "Should the requirement to participate in experiments be introduced, how likely is it that you personally would be required to participate in order to graduate?" with participants' responses recorded on a scale ranging from 1 (*not at all likely*) to 10 (*very likely*). The third question asked, "Should the requirement to participate in the experiments be introduced how likely is it that it will apply to students graduating in your year?" with responses recorded on a scale ranging from 1 (*not at all likely*) to 10 (*very likely*). The fourth question asked, "How probable is it that the requirement to participate as subjects in the experiments will be introduced at the University of Rome and will apply to students graduating in your year?" with the responses recorded on a scale ranging from 1 (*not at all likely*) to 10 (*very likely*) and averaged to form a single index of *personal involvement* (Cronbach's $\alpha = .76$).

At the end of the session, the participants were requested to provide their telephone numbers so that they could be invited to participate in the second phase of the study. All participants expressed their willingness to be available for the second phase and provided their telephone numbers as requested.

Phase II

As noted earlier, the second phase occurred 3 weeks following Phase I. The participants were contacted by telephone and reminded of their agreement to take part in research about attitudes toward the proposal to institute the required experimental participation of university students. At this point, the participants' attitudes toward this proposal were measured again via the same seven items used during Phase I (Cronbach's $\alpha = .94$).

After their attitudes were measured, the participants were presented with a request (portrayed as independent of the proposed requirement of experimental participation) to participate

in a study to be conducted the following week and to indicate the time during which they were available to participate. Of the 124 initial participants, 73 (58.9%) agreed to make a specific appointment. The participants' expressed readiness to show up for the experiment (and to indicate a specific time at which they would be available to do so) constituted our measure of *behavioral intentions* (at Time 2) to comply with our request. The telephone interviews took approximately 5 minutes to complete and were conducted by an individual unaware of the experimental hypotheses regarding attitude stability and attitude-behavior correspondence.

Phase III

In Phase III, 1 week following Phase II, we assessed the actual behavior of our participants. Specifically, we recorded whether those individuals who committed to showing up at a specific time actually delivered on their promise. Of the 73 participants who made such a commitment, only 54 (74%) actually honored it.¹ Individuals who did show up were invited to participate in another one of our experiments on a different topic. After the participants had responded to the questionnaire items, they answered an open-ended question about their perceived purpose of the study. None of the participants reported suspicion about any aspect of the cover story.

This completed the experiment. The participants were thoroughly debriefed, thanked, and dismissed. To construct our behavioral measure at Time 3, we assigned the numeral 1 to all the participants who actually showed up for the study as promised (43.5% of the initial pool of participants) and assigned 0 both to the participants who did not indicate at Time 2 a specific time at which they would be available and to the participants who did indicate such time yet failed to show up.

RESULTS

The following description of the results is ordered accordingly to our previous discussion and analysis. We first report the results of our manipulation checks and findings regarding the persuasion phase of our experiment (Phase I), designed as (the indispensable) replication of prior studies. We

¹ Attrition check. Because, in this study, the dropout rate between the second and third research phases (between the participants who expressed their readiness to show up for the experiment at Time 2 and the participants who actually honored their commitment at Time 3) was quite substantial (26%), we need to report some information about possible attrition or "mortality rate" effects. Following the recommendation of Goodman and Blum (1996), we assessed the possible presence of a non-random sampling bias using multiple logistic regression analysis. This analysis is recommended because it models the probability of being included in one of two response categories (e.g., remaining in or leaving a sample) and because it takes into account the relationship among the variables (Goodman & Blum, 1996, p. 634). In this analysis, we used a dichotomous variable distinguishing the participants who actually honored their commitment at Time 3 from those who dropped out (who expressed their readiness to show up for the experiment at Time 2 but did not actually honor their commitment at Time 3) as the dependent variables, and all the variables of interest to the research manipulated (length, expertise, and involvement) or measured at the first or at second phases (attitudes at Time 1 or at Time 2) as the independent variables. Results of this analysis do not show any significant effect of our independent variables, contradicting the presence of non-random sampling (i.e. indicating that the data are missing at random).

subsequently report the findings concerning the crucial next phases of this study, namely, Phase II concerning with attitude persistence over time and last of all, Phase III addressing the attitude behavior relations.

Manipulation Checks

Perceived Expertise

A $2 \times 2 \times 2$ ANOVA performed on our expertise-index data yielded the expected main effect of expertise, $F(1, 116) = 11.15, p < .001$, and not surprisingly, a marginally significant main effect of lengthy information, $F(1, 116) = 3.61, p < .06$. For all other effects, $p > .10$. Specifically, the participants in the high expert condition rated the communicator as more expert ($M = 7.53$) than did the participants in the low expert condition ($M = 6.69$).

Personal Involvement

A $2 \times 2 \times 2$ ANOVA yielded the expected main effect of involvement, $F(1, 116) = 16.51, p < .001$. For all other effects, $p > .30$. As expected, the participants in the high involvement condition perceived themselves as more involved in the issue ($M = 7.20$) than did the participants in the low involvement condition ($M = 5.84$). These findings attest to the efficacy of our expertise and involvement manipulations.

Dependent Measures

Attitudes at Time 1

A $2 \times 2 \times 2$ ANOVA on the Time 1 attitudes index yielded a significant main effect of expertise, $F(1, 116) = 10.64, p < .001$, revealing that the participants in the *expert* condition ($M = 8.15$) had a more positive attitude toward the proposal than did the participants in the *inexpert* condition ($M = 7.11$). Of greater interest, the predicted three-way interaction between expertise, involvement, and information length was significant, $F(1, 116) = 8.68, p < .004$; for all other effects, $p > .13$. The pertinent means are displayed in Table 1.

Two 2×2 ANOVAs (one within each information length condition) inquired into the specific nature of this three-way interaction. Specifically, the two-way interaction of involvement by expertise was significant in the predicted directions both for the brief source condition, $F(1, 61) = 4.46, p < .039$, and for the lengthy source condition, $F(1, 55) = 4.35, p < .04$. Simple tests on means defining these interactions corroborated our predictions. Where the expertise information was brief, the difference between the expert and inexpert conditions was significant under low involvement, $F(1, 32) = 15.19, p < .001$ ($M_{\text{expert}} = 8.55; M_{\text{inexpert}} = 6.56$) but not under high involvement, $F < 1$ ($M_{\text{expert}} = 7.23; M_{\text{inexpert}} = 7.21$). By contrast, when the expertise information was lengthy, the difference between the expert and inexpert conditions was significant under high involvement, $F(1, 24) = 7.89, p < .01$ ($M_{\text{expert}} = 8.56; M_{\text{inexpert}} = 6.54$) but not under low involvement, $F < 1$ ($M_{\text{expert}} = 8.19; M_{\text{inexpert}} = 7.95$). Thus, the pattern of attitude judgments in this study accords with our predictions and conceptually replicates the findings of Pierro et al. (2005) who used a different

persuasion topic (final comprehensive examinations for graduating college students) in their study.

Note that such replication forms the necessary precondition for testing hypotheses about differential persistence of attitude change and its differential relation to behavior. Specifically, to show that attitude change based on extensive versus brief processing exhibited differential persistence and relation to behavior, it is incumbent to show, first, that it occurred in a theoretically predicted manner. Our Time 1 findings attest that this was so.

Attitudes at Time 2

A $2 \times 2 \times 2$ ANOVA on Time 2 attitudes yielded a significant main effect of expertise, $F(1, 116) = 7.03, p < .009$, revealing that the participants in the *expert* condition had a more positive attitude toward the proposal ($M = 8.10$) than did the participants in the *inexpert* condition ($M = 7.45$). In addition, the predicted three-way interaction between expertise, involvement, and information length was significant, $F(1, 116) = 3.83, p < .05$. For all other effects, $p > .08$. The pertinent means are displayed in Table 1.

The two-way interaction of involvement by expertise was significant in the predicted directions *only* in the *lengthy* source condition, $F(1, 55) = 8.27, p < .006$, and was *nonsignificant* in the *brief* source condition, $F < 1$. When the expertise information was lengthy, the difference between the expert and inexpert conditions was significant under high involvement, $F(1, 24) = 17.40, p < .001$ ($M_{\text{expert}} = 8.62; M_{\text{inexpert}} = 6.58$), but not under low involvement, $F < 1$ ($M_{\text{expert}} = 8.08; M_{\text{inexpert}} = 7.92$). These results give the first hint that a thorough processing of source information afforded when such information is lengthy and requires extensive elaboration, *and* when the recipient has sufficient motivational resources for extensive elaboration—resulted in more persistent attitudes than was the case when the information was brief and required relatively shallow processing.

Behavioral Intentions at Time 2

The appropriate *logistic regression* yielded only a significant three-way interaction effect between expertise, involvement, and information length ($B = .454, p < .036$); for all other effects, $p > .08$. Proportions of participants' who indicated an intention to participate in the study as requested (those who indicated a specific time for showing up) are displayed in Table 1.

The two-way interaction of involvement by expertise was significant in the predicted directions *only* in the *lengthy* source condition ($B = .847, p < .01$) and was *nonsignificant* in the *brief* source condition, $p < .82$. When the expertise information was lengthy, the difference of intention to participate between the expert and inexpert conditions was significant under high involvement ($B = .128, p < .031$), ($\%_{\text{expert}} = 92.9; \%_{\text{inexpert}} = 50$) but not under low involvement, $p < .25$ ($\%_{\text{expert}} = 42.9; \%_{\text{inexpert}} = 63.2$). These data suggest that, as predicted, participants expressed a serious intention to show up for the experiment (indicated by commitment to a specific time of appearance) when the source information was lengthy and required extensive elaboration, and when they were motivated enough to perform it.

Table 1. Attitudes (at Times 1 and 2), behavioral intentions at Time 2, and behavior at Time 3 as a function of source expertise, length of source information, and issue involvement

Length of source information	Attitudes at Time 1			
	Brief		Lengthy	
	Inexpert	Expert	Inexpert	Expert
Source expertise				
Low involvement	6.56 (1.71)	8.55 (0.99)	7.95 (1.63)	8.19 (1.07)
High involvement	7.21 (2.56)	7.23 (1.55)	6.54 (2.17)	8.56 (8.56)
Attitudes at Time 2				
Low involvement	7.56 (1.26)	7.92 (0.99)	7.92 (1.45)	8.08 (0.86)
High involvement	7.43 (1.87)	7.75 (1.40)	6.58 (1.47)	8.62 (1.01)
Attitudes stability (Time 2–Time 1)				
Low involvement	1.00 (2.35)	-.63 (1.16)	-.02 (1.07)	-.11 (0.72)
High involvement	.21 (2.02)	.52 (0.65)	.05 (1.42)	.06 (0.82)
Behavioral intentions at Time 2 ^a				
Low involvement	55%	64.3%	63.2%	42.9%
High involvement	50%	53.8%	50%	92.9%
Actual behavior at Time 3 ^b				
Low involvement	45%	50%	47.2%	28.6%
High involvement	33.3%	30.8%	33.3%	78.6%

^a% of appointment.

^b% of actual behavior (in bracket *SD*).

Actual Behavior at Time 3

A logistic regression on Time 3 behavior yielded only a significant three-way interaction between expertise, involvement, and information length ($B = .391$, $p < .047$). For all other effects, $p > .09$. The pertinent proportion of participation (those showing up for the experiment) are displayed in Table 1.

The two-way interaction of involvement by expertise was significant in the predicted directions *only* in the *lengthy* source condition ($B = .70$, $p < .01$) and was *nonsignificant* in the *brief* source condition, $p < .76$. When the expertise information was lengthy, the difference in participation between the expert and inexpert conditions was significant under high involvement ($B = .99$, $p < .026$), ($\%_{\text{expert}} = 78.6$; $\%_{\text{inexpert}} = 33.3$) but not under low involvement, $p < .28$ ($\%_{\text{expert}} = 28.6$; $\%_{\text{inexpert}} = 47.2$).

Stability of Attitude Change

Predictions regarding the stability (*or persistence*) of attitude change as a function of our independent variables (length, expertise and involvement) were tested by means of a $2 \times 2 \times 2$ mixed-model ANOVA, with time (attitudes at Time 1 and at Time 2) as a within-subjects factor (for a similar procedure of testing attitude persistence, see Sengupta, Goodstein, & Boninger, 1997). Tests involving “time” within-subject effect revealed only a marginally significant quadruple interaction effect of time with length, expertise and involvement ($F(1, 116) = 2.84$, $p = .09$). The critical three-way interaction of time with expertise and involvement achieved *significance* only under *brief* source condition ($F(1, 61) = 4.54$, $p < .05$) and was *nonsignificant* in the *lengthy* source condition, $F < 1$. To further examine the components of this significant three-way interaction in the *brief* condition, we performed two 2 (expertise) \times 2 (time) mixed-model ANOVAs (one within each involvement condition). Results yielded that the two-way interaction was significant only in the *low involvement* condition ($F(1, 32) = 5.69$, $p < .05$) and was *nonsignificant* in the *high involvement* condition, $F < 1$. Specifically, in the *brief*

source condition, for low involvement participants, the source expertise variable produced attitudinal instability from Time 1 to Time 2: attitudes produced by the low source expert increased from Time 1 to Time 2 (Table 1, $M_{\text{dif}} = 1.00$; $F(1, 19) = 3.57$, $p = .07$), whereas attitudes produced by the high source expert decayed over time (Table 1, $M_{\text{dif}} = -0.63$; $F(1, 13) = 4.17$, $p = .06$).

This data pattern is consistent with our analysis: In the *lengthy* condition, the participants under low involvement who did not *change* their initial attitudes as a consequence of Time 1 communication by an expert or inexpert source maintained their initial (unchanged) attitudes also at Time 2. Furthermore, the participants under high involvement who *did change* their initial attitudes at Time 1 as a function of source expertise persisted with the changed attitudes also at Time 2. As a consequence, both participants under *low* involvement and those under *high* involvement maintained attitude stability from Time 1 to Time 2 (albeit of *different* attitudes) as reported earlier.

In the *brief* condition, the participants under high involvement who did not change their initial attitudes at Time 1 as a consequence of the persuasive information presented to them at Time 1 by an expert or inexpert source² remained stable with these unchanged attitudes also at Time 2. Of greater interest, those under low involvement who did change their initial attitudes at Time 1 as a function of the source expertise did not maintain these attitudes by Time 2, producing the observed interaction effect mentioned earlier, thus displaying a typical sleeper effect (Hovland, Lumsdaine, & Sheffield, 1949; for recent meta-analytic review on sleeper effect, see Kumkale & Albarracin, 2004).

Relationship between Attitudes (Times 1 and 2) and Behavior/Intentions (at Times 2 and 3)

Predictions regarding the relationship between attitudes (at Times 1 and 2) and behavior (at Times 2 and 3) as a

²Presumably because they were motivated to process the message as such that was constant across the expert and inexpert conditions.

function of our independent variables (length, expertise and involvement) were tested by means of four logistic regression analyses. One analysis was conducted using attitudes at Time 1 as a predictor, whereas the second analysis was conducted using attitudes at Time 2 as a predictor. In these analyses, we regressed the behavior/intention data at Time 2 or at Time 3 on the main effects of attitudes (at Time 1 or at Time 2, centered score), length of source information (contrast coded: brief = -1; length = 1), source expertise (contrast coded: inexperienced = -1; expert = 1), issue involvement (contrast coded: low = -1; high = 1), and all the possible double, triple, and quadruple interactions between attitudes and the several independent variables.

Relationship between Attitudes at Time 1 and Behavior/Intentions at Times 2 and 3

Results of the logistic regression analysis performed on behavioral intentions at Time 2 (as the criterion variable) yielded a positive significant main effect of attitudes at Time 1 ($B = .89, p < .05$) as well as a positive significant two-way interaction between attitudes at Time 1 and length of source information ($B = 1.21, p < .01$).

Of greater interest is the finding of a positive significant three-way interactions on Time 2 behavioral intentions between attitudes at Time 1, issue involvement, and length of source information ($B = 1.17, p < .027$). All other effects were not significant.

A simple interaction analysis conducted to further understand the nature of the three-way interaction revealed that the interaction between attitudes at Time 1 and issue involvement on Time 2 behavioral intentions was positive and marginally significant for the participants in the *lengthy* condition ($B = 4.92; p < .13$) and negative and significant for the participants in the *brief* condition ($B = -.65; p < .03$). The simple slope analysis conducted to analyze the two-way interaction (between attitudes at Time 1 and issue involvement) for the participants in the *lengthy* condition revealed that the relationship between attitudes at Time 1 and Time 2 behavioral intentions was *positive* and significant for participants with high involvement ($B = 2.83, p < .02$) but not for those with low involvement ($B = .41, ns$). These findings accord with our expectations.

A simple slope analysis conducted on the same two-way interaction (attitudes at Time 1 and issue involvement) for the participants in the *brief* condition revealed that the relationship between attitudes at Time 1 and Time 2 behavioral intentions was (unexpectedly) *negative* and significant for participants whose involvement was high ($B = -.94, p < .03$) but not for participants whose involvement was low ($B = .13, ns$).

The results of a logistic regression analysis performed on behavior at Time 3 (as a criterion variable) yielded, again, a positive significant main effect of attitudes at Time 1 ($B = 1.18, p < .01$), as well as a positive significant two-way interaction between attitudes at Time 1 and length of source information ($B = 1.26, p < .008$). Of greater interest is the marginally positive significant three-way interaction between attitudes at Time 1, length of source information, and issue involvement ($B = .86, p < .087$). All other effects were not significant.

A simple slope analysis revealed that the interaction between attitudes at Time 1 and issue involvement in predicting behavior at Time 3 was positive and marginally significant for the participants in the *lengthy* condition ($B = 2.03; p < .16$) but nonsignificant for the participants in the *brief* condition ($B = -.17, ns$). The simple slope analysis conducted to analyze the two-way interaction (attitudes at Time 1 and issue involvement) for the participants in the *lengthy* condition revealed, consistent with our predictions, that the relationship between attitudes at Time 1 and behavior at Time 3 was significant for participants whose involvement was high ($B = 4.00, p < .02$) but not for participants whose involvement was low ($B = .72, ns$).

Relationship between Attitudes at Time 2 and Behavior/Intentions at Times 2 and 3

Results of a logistic regression analysis performed on behavioral intentions at Time 2 (as the criterion variable) yielded a significant and positive main effect of attitudes at Time 2 ($B = .56, p < .039$). In addition, we found a significant three-way interaction between attitudes at Time 2, length of source information, and issue involvement ($B = .57, p < .043$). All other effects were not significant.

A simple slope analysis conducted to further understand the nature of the three-way interaction revealed that the interaction between attitudes at Time 2 and issue involvement in predicting behavioral intentions at Time 2 was positive and significant for the participants in the *lengthy* condition ($B = 1.04, p < .05$) but not for the participants in the *brief* condition ($B = -.49, ns$). The simple slope analysis conducted to analyze the two-way interaction (attitudes at Time 2 and issue involvement) for the participants in the *lengthy* condition revealed that the relationship between attitudes at Time 2 and behavioral intentions at Time 2 was significant for participants whose involvement was high ($B = 1.60, p < .01$) but not for participants whose involvement was low ($B = .11, ns$).

The results of logistic regression analysis performed on behavior at Time 3 (as a criterion variable) yielded a significant and positive main effect of attitudes at Time 2 ($B = .95, p < .013$) and a significant and positive two-way interaction between attitudes at Time 2 and length of source information ($B = .93, p < .018$). Of greater interest is the finding of a significant three-way interaction between attitudes at Time 2, length of source information, and issue involvement ($B = .81, p < .048$). All other effects were not significant.

A simple slope analysis revealed that the interaction between attitudes at Time 2 and issue involvement in predicting behavior at Time 3 was positive and significant for the participants in the *lengthy* condition ($B = 1.31, p < .04$) but nonsignificant for the participants in the *brief* condition ($B = -.35, ns$). The simple slope analysis conducted to analyze the two-way interaction (attitudes at Time 2 and issue involvement) for the participants in the *lengthy* condition revealed that, as predicted, the relationship between attitudes at Time 2 and behavior at Time 3 was significant for participants whose involvement was high ($B = 2.96, p < .01$) but not for participants whose involvement was low ($B = .25, ns$). Overall then, these analyses suggest that the relation between expertise-induced attitude change and (i) relevant behavioral

intentions and (ii) actual attitude-consistent behavior is significant for participants given the *lengthy* expertise information provided they are highly involved in the issue and hence motivated to process it extensively.

DISCUSSION

The process whereby attitudes acquired (or altered) in the course of a persuasive episode persist over time and foster attitude-consistent behavior has been of considerable interest to persuasion researchers (for reviews, see Albarracín et al., 2005). An important insight into this process has been offered by dual-process theorists (Chaiken et al., 1989; Petty & Cacioppo, 1986) who linked attitude persistence and the attitude-behavior linkage to the extent of information processing. Presumably, extensive processing of attitudinally relevant information (i.e., evidence warranting the adoption of a given attitude) creates multiple links to the attitude concept. These may later serve as retrieval cues for the attitude rendering it readily activated and highly accessible, hence increasing its potential for relatedness to behavior (Fazio, 1990).

Present findings support the notion that the extent of information processing matters and that conditions that promote extensive processing, such as a lengthy informational stimulus and recipients' high degree of involvement in the issue (increasing their processing motivation), significantly enhance the attitude's persistence and its connection both to behavioral intentions (as attested by the findings of Phase II of our study) and to actual, attitude consistent behavior (as attested by the findings of Phase III).

However, beyond its support for the role of processing *extent* in the formation of stable, behavior-sustaining, attitudes, the present findings afford novel insight into the nature of such processing. Prior notions invariably equated *extensive processing* with the processing of *message or issue* information (Chaiken, 1980, Study 1; Chaiken & Eagly, 1983, Study 2; Cacioppo et al., 1986; Leippe & Elkin, 1987; Mackie, 1987; Petty & Cacioppo, 1986; Petty et al., 1983), in this sense conflating the *how* of processing with the *what* of processing. In other words, extensive processing need not be directed at message or issue information but rather may be applied to source information as well. Indeed, the present findings suggest that extensive processing of *source information* has identical effects on the stability of attitudes and their relation to behavior to effects heretofore ascribed uniquely to the extensive processing of message/issue information. Thus, in the presence of conditions for the extensive processing of source information (i.e., in the presence of a considerable information to process, plus an adequate degree of motivation for processing), the resultant attitudes were found to be considerably more stable and more strongly related to behavior than in the absence of those conditions.

Note that the idea of extensive processing of *source information* did not arise in prior persuasion research for the simple reason that in the great preponderance of cases (see Pierro et al., 2005 for a review), source information (as well as other types of peripheral or heuristic information) was presented relatively briefly and simply, that is, in a manner that does not call for, or allow, extensive processing. The present studies as well as prior relevant research (Chun & Kruglanski, 2006; Kruglanski

& Thompson, 1999; Pierro et al., 2005; for reviews, see Kruglanski et al., 2006; Kruglanski et al., 2007) suggest that information previously considered as peripheral or heuristic can indeed be processed extensively. And when it is, this study shows, it produces stable, behavior-affording attitudes.

Can the present findings be accommodated by the dual-mode views of persuasion? Possibly relevant to this question is the notion that variables can have *multiple roles in persuasion* (Petty & Wegener, 1998). According to this concept, a source variable can act not only as a peripheral cue but also as a message argument in the appropriate circumstances. The example frequently given for this phenomenon is when an attractive model (attractiveness being a source variable) recommends a cosmetic product of some sort. In this case, the model's beauty (e.g., smooth skin or full bodied hair) can be regarded as an argument for the product's efficacy (suggesting that her attractiveness was prompted by use of the product). In contrast, if the same model were to recommend a mechanical product, say a car, her appeal would be considered a peripheral cue having nothing to do with the message about the car's advantageous features.

In comparing these two examples, note that *the relation* between the source and a message changes. In case of the cosmetic product, the source's quality (beauty) is relevant to the message; and in case of the mechanical product (car's features), it is irrelevant to the message. This is very different from the present case where the relation between the source and the message remains the same, because the source information is of the same *content*, and what changes is merely its *length*.

One might argue, of course, that *length* is exactly what defines a variable as a cue or a message argument. But such view of the cue/argument distinction (i) would be contrary to its prior use in the persuasion literature, and, more importantly, (ii) it would obviate the *qualitative* distinction between modes of persuasion insofar as length is a *quantitative* parameter (for discussions, see Kruglanski & Gigerenzer, 2011; Kruglanski et al., in press; Kruglanski et al., 2006; Kruglanski et al., 2007). Thus, it appears that the present data cannot be readily accommodated by the dual-mode theories of persuasion as these are currently stated.

The realization that information external to the message or the issue (e.g., source information) may result in strong attitudes that exhibit stability over time as well as the ability to prompt behavior has important applied consequences. It suggests that communicators may be able to instill in recipients such robust attitudes even though the recipients lacked the background knowledge, or self-ascribed *epistemic authority*, needed to comprehend the message arguments and had to rely on information external to the issue or the message to form their attitudes (Kruglanski et al., 2005). The present results suggest that the formation of such strong attitudes from issue-external information (e.g., source information) may be afforded if conditions existed for a thorough and extensive processing of such information.

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